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(54) Dry powder inhaler

(57) A dry powder inhaler device 1 has a flat housing 2A,2B having an air inlet 9,9' and an inhalant outlet 10,10' including a mouthpiece 13. A rotor 4 is provided in the form of a disc having a plurality of recesses 8 for inhalant arranged around its axis of rotation. The rotor is disposed within a chamber 3 in the housing sized to closely fit the disc, and the recesses are indexable, in a single direction of rotation of the disc about its axis relative to the housing, in turn to a dispensing position in which both the air inlet and the outlet are in communication with the recess 8 for the time being located at a dispensing position. Thereby, in use, a pre-metered dose of powdered inhalant within the recess 5 at the dispensing position can be inhaled by a user by being drawn out of the recess entrained in a flow of air through the inlet 9,9', the recess 8 and the outlet 10,10' and mouthpiece 13.

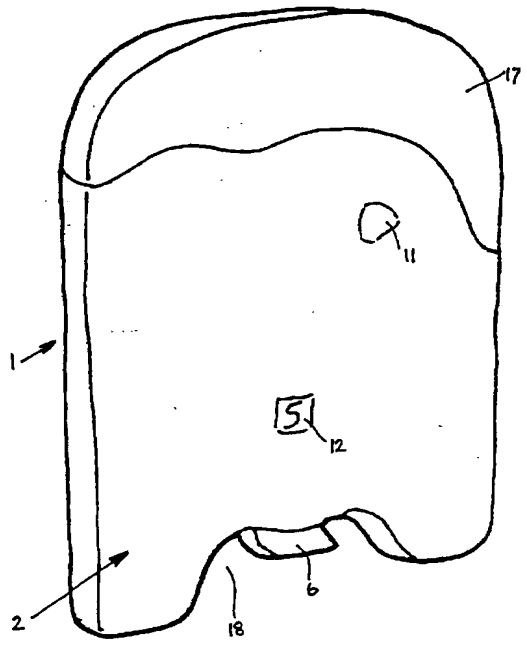

Fig. 1

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[0016] In the following description, the same reference numerals will be used for the same or similar parts in both devices.

[0017] The inhaler 1 shown in the figures has a transparent polypropylene or other plastics housing 2 which, for the sake of convenience is shown, in figure 2, in two parts 2A,2B, but which may be formed from a single, hinged blank. The housing is approximately credit-card size for convenience and has, in one half 2A, a generally circular chamber 3 which contains a disc like polypropylene (or similar) rotor 4 with a castellated edge providing plural edge recesses 5 separated by lands 6. A spring leg 7 disposed in the housing 2, or formed integrally with it, provides a ratchet action by engagement of one end in the edge recesses in turn as the disc like rotor is rotated about its axis. To facilitate this the edge recesses 5 are chamfered on one side to allow the spring leg 7 to ride out of the recesses over the adjacent land when the rotor 4 is turned in one direction.

[0018] The disc like rotor has inhalant dose recesses 8 disposed peripherally around the rotor disc 4 in one face 4A of the rotor, the number of inhalant dose recesses equalling the number of edge recesses 5 and being positioned so that each recess in turn is registrable with air inlet and outlet channels 9',10' formed in the housing half 2B. In an alternative form of the device, the air channels may be formed between the housing halves 2A,2B.

[0019] Primary and secondary air inlet channels 9,9' and outlet channels 10,10' are preferably provided so that a primary inlet airflow passes through a primary inlet channel 9 and into the main or primary outlet channel 10, with a secondary airflow through the inlet channel 9' and secondary outlet channel 10', the flow through the secondary inlet channel 9' and a secondary air outlet channel 10' being arranged to pass through the recess at the dispensing position, caused by the flow through the primary air inlet channel 9 and primary outlet channel 10 and the resulting pressure drop at the junction with the secondary air outlet channel 10'. The advantage of this is that powder inhalant is fed gradually into the outlet airstream. Depending on the specific use of the inhaler, the target users, the specific inhalant etc., the relative sizes of the channels may be altered accordingly. The main outlet channel 10 extends into a mouthpiece 13.

[0020] The exterior face of the housing half 2B is printed so as to reveal a windows 11 which is positioned over the junction of the inlet 9' and subsidiary outlet channel 10' and at a position overlying the dispensing position of each of the recesses in turn. This allows the pre-metered dose of medicament arranged in each dose recess 8 to be checked before use and enables the user to check that all the medicament has been inhaled from the recess 8 at the dispensing position.

[0021] A further window 12 is provided located at a position overlying a series of numeric indicia 14, acting as does usage counters, printed on the disc rotor 4. These can be viewed through the window 12 to allow a user to check the number of doses either remaining or used.

[0022] The rotor may be held in position by a circular rivet or plug 15 which locates through opposed holes 16 in the housing halves 2A,2B and the rotor 4. The rotor disc 4 may be biassed into engagement with the housing half 2B by a coil spring or the like (not shown) in order to seal the recesses 8 against ambient moisture. Alternatively, not shown, a foil seal may be provided over each recess 8, for example, and being stripped away by a stripper as the recess approaches the dispensing position. A hinged cover 17 covers the mouthpiece 13 until the inhaler is used, at which time it can be pivoted away from the mouthpiece.

[0023] To allow a user to rotate the rotor disc 4, the housing 2 is cut away on the side opposite the mouthpiece 13, providing a hollow 18 through which the lands 6 of the rotor disc 4 pass and can be engaged by a user's finger or thumb.

Claims

1. A dry powder inhaler device including

   a flat housing having an air inlet and an inhalant outlet including a mouthpiece; and
   a rotor comprising a disc having a plurality of recesses for inhalant arranged around its axis of rotation, the rotor being disposed within a chamber in the housing sized to closely fit the disc, and the recesses being indexable, in a single direction of rotation of the disc about its axis relative to the housing, in turn to a dispensing position in which both the air inlet and the outlet are in communication with the recess for the time being located at a dispensing position, whereby in use a pre-metered dose of powdered inhalant within the recess at the dispensing position can be inhaled by a user by being drawn out of the recess entrained in a flow of air through the inlet, the recess and the outlet and mouthpiece.

2. A dry powder inhaler device according to claim 1, wherein the housing is substantially credit-card size in area.

3. A dry powder inhaler device according to claim 1 or claim 2, wherein the housing has a thickness of between 2 and 5 mm.

4. A dry powder inhaler device according to any of claims 1 to 3, wherein the rotor and walls of the chamber are a sealing fit.

5. A dry powder inhaler device according to any of claims 1 to 3, including seals around and/or over

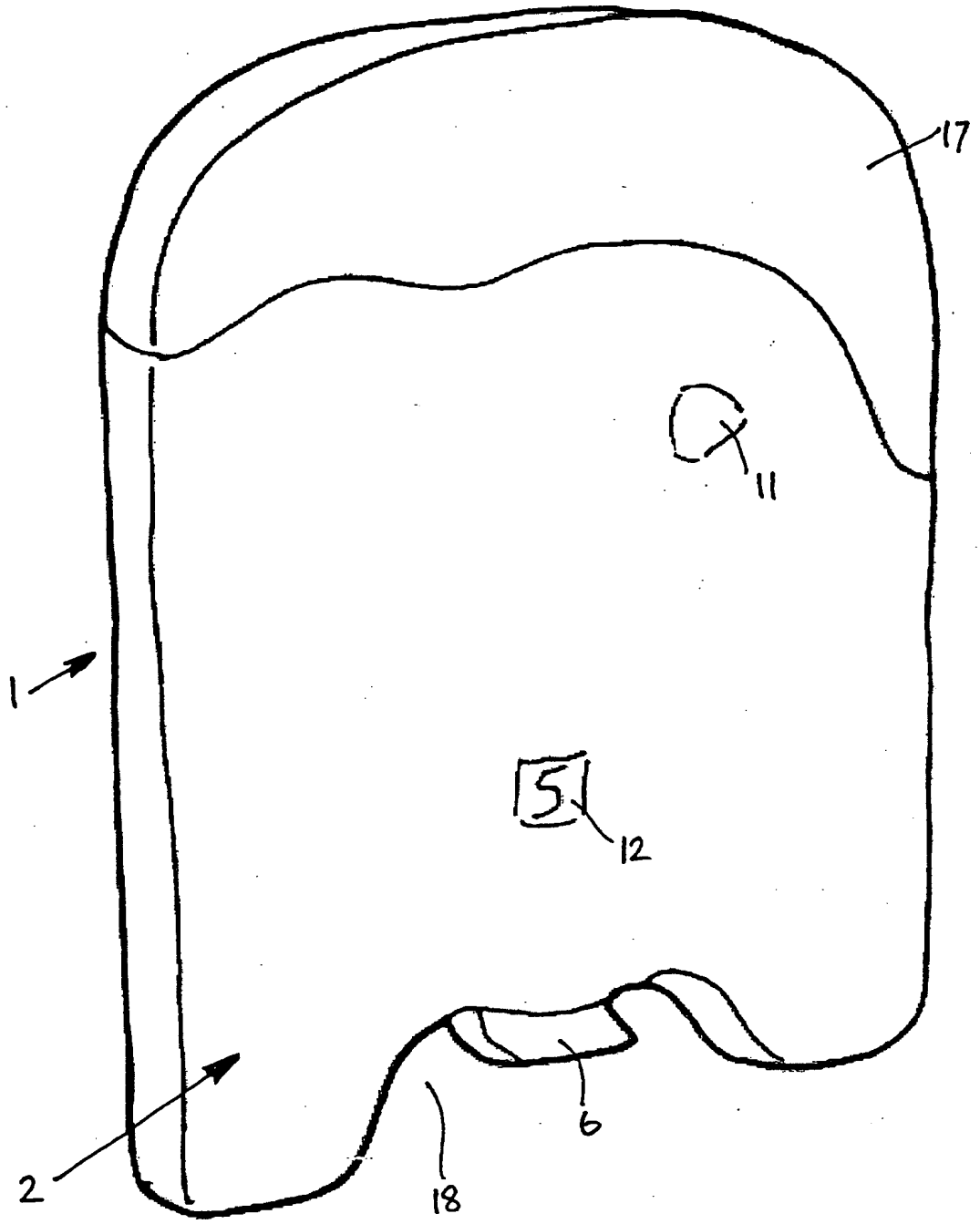
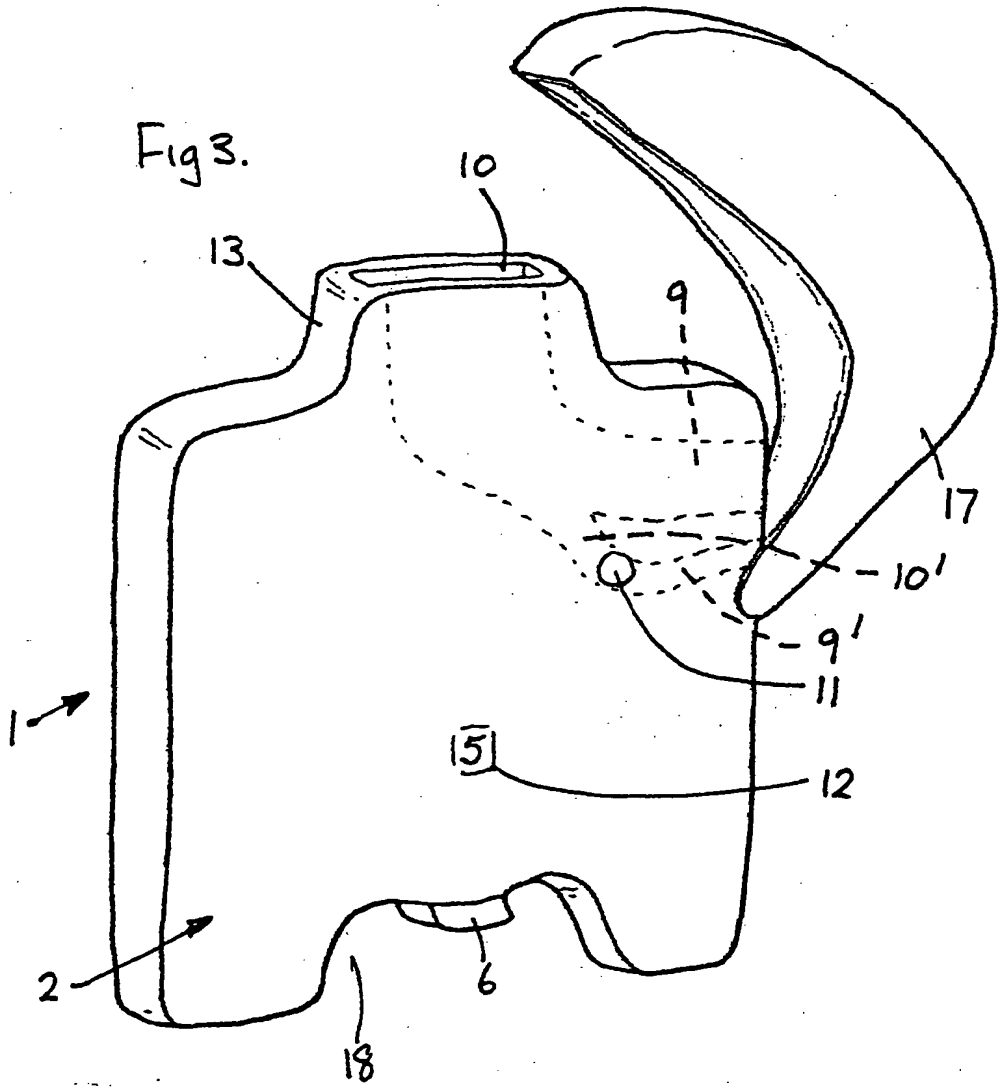


Fig. 1

Fig 3.



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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 6025

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	23 November 2000	Nielsen, M

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 30 6025

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